STATUS OF THE CLAIMS

Claims 1-29 were originally filed in this patent application. In the pending office action dated 10/30/2006, claim 15 was objected to for informalities. Claims 1-2, 4, 9-10, 12-13, 16-19 and 21 were rejected under 35 U.S.C. §112, second paragraph. Claims 9-10, 12-13 and 16-25 were rejected under 35 U.S.C. §101. Claims 1, 9 and 16-18 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,513,028 to Lee *et al.* (hereinafter "Lee"). Claims 2, 10 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lee in view of U.S. Patent Application Publication 2004/0122845 to Lohman *et al.* (hereinafter "Lohman"). Claims 4, 12-13 and 21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lee in view of U.S. Patent Application Publication 2004/0225639 to Jakobsson *et al.* (hereinafter "Jakobsson"). Claims 3, 11 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lee and Lohman and further in view of U.S. Patent Application Publication 2005/0097084 to Balmin *et al.* (hereinafter "Balmin"). Claims 5, 7, 14, 22-24 and 26-28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lee in view of Balmin and further in view of Jakobsson. Claims 6, 8, 15, 25 and 29 were rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Lee, Balmin, Jakobsson and Lohman. No claim was allowed. In this amendment, claims 1-4, 9-13, 16-21, 23-24 and 27-28 have been cancelled, and claims 5, 7, 14-15, 22 and 26 have been amended. Claims 5-8, 14-15, 22, 25-26 and 29 are currently pending.

REMARKS

<u>Objection to claim 15</u>

The examiner objected to claim 15 for a typographical error in the dependent claim number. Claim 15 has been amended herein to correct this error by reciting claim 14 as the proper independent claim upon which claim 15 depends. This amendment overcomes the examiner's objection to claim 15.

<u>Rejection of claims 1-2, 4, 9-10, 12-13, 16-19 and 21 under 35 U.S.C. §112, second paragraph</u>

The examiner rejected claims 1-2, 4, 9-10, 12-13, 16-19 and 21 under 35 U.S.C. §112, second paragraph. Claims 1-2, 4, 9-10, 12-13, 16-19 and 21 have been cancelled herein, and therefore need not be addressed.

<u>Rejection of claims 9-10, 12-13 and 16-25 under 35 U.S.C. §101</u>

The examiner rejected claims 9-10, 12-13 and 16-25 under 35 U.S.C. §101 as being directed to nonstatutory subject matter. Claims 9-10, 16-21 and 23-24 have been cancelled herein, and therefore need not be addressed. The remaining claims that need to be addressed are claims 22 and 25.

Claim 22 has been amended herein to recite a computer-readable program product in the preamble, and to recite recordable media in limitation (B), incorporating the limitations in former claim 23, which has been cancelled. Claim 22 is thus limited to tangible, recordable media. Recordable media that bears patentable computer software is an article of manufacture according to <u>In re Beauregard</u>, 53 F3d 1583, 35 USPQ2d 1383

(Fed. Cir. 1995). Claim 25 depends in claim 22, and therefore also defines statutory subject matter.

Should the examiner be inclined to maintain the rejection of claims 22 and 25 under 35 U.S.C. §101, applicants respectfully request the examiner consult a 101 committee within the USPTO. Dozens of other patent applications with similar claims have been successfully prosecuted to issuance under the new guidelines. Should the examiner decide to maintain this rejection, applicants respectfully request the examiner provide a detailed rationale for the rejection so the examiner's rejection may be adequately addressed on appeal.

Rejection of claims 1, 9 and 16-18 under 35 U.S.C. §102(b)

The examiner rejected claims 1, 9 and 16-18 under 35 U.S.C. §102(b) as being anticipated by Lee. Claims 1, 9 and 16-18 have been cancelled herein, and therefore need not be addressed.

Rejection of claims 2, 10 and 19 under 35 U.S.C. §103(a)

The examiner rejected claims 2, 10 and 19 under 35 U.S.C. §103(a) as being unpatentable over Lee in view of Lohman. Claims 2, 10 and 19 have been cancelled herein, and therefore need not be addressed.

Rejection of claims 4, 12-13 and 21 under 35 U.S.C. §103(a)

The examiner rejected claims 4, 12-13 and 21 under 35 U.S.C. §103(a) as being unpatentable over Lee in view of Jakobsson. Claims 4, 12-13 and 21 have been cancelled herein, and therefore need not be addressed.

Rejection of claims 3, 11 and 20 under 35 U.S.C. §103(a)

The examiner rejected claims 3, 11 and 20 under 35 U.S.C. §103(a) as being unpatentable over Lee and Lohman and further in view of Balmin. Claims 3, 11 and 20 have been cancelled herein, and therefore need not be addressed.

Rejection of claims 5, 7, 14, 22-24 and 26-28 under 35 U.S.C. §103(a)

The examiner rejected claims 5, 7, 14, 22-24 and 26-28 under 35 U.S.C. §103(a) as being unpatentable over Lee in view of Balmin and Jakobsson. Claims 23-24 and 27-28 have been cancelled herein, and therefore need not be addressed. Each of the remaining claims is addressed below.

Claim 5

In the rejection, the examiner states that Lee teaches "the query optimizer, for each additional key in the sub-optimal index, reads statistical information regarding the additional key", citing the rejection to claim 1, which cites col. 6 lines 14-19, 42-47 et seq. of Lee. Nowhere does Lee teach or suggest reading statistical information regarding additional keys in a sub-optimal index. Because the examiner has not identified a teaching in Lee that corresponds to the statistical information in claim 5, the examiner has failed to establish a prima facie case of obviousness for claim 5 under 35 U.S.C. §103(a). Lee does teach a way to provide values for missing key columns in an index. However, Lee does not teach or suggest reading statistical information regarding additional keys, as recited in claim 5. For this reason alone, claim 5 is allowable over the combination of Lee, Balmin and Jackson.

In the rejection of claim 5, the examiner admits that Lee does not explicitly disclose rewriting the query using the statistical information in a manner that allows

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probing the sub-optimal index according to the rewritten query. The examiner then states that Balmin discloses this limitation, citing para. 17 et seq. of Balmin. Applicants respectfully assert that the query rewriting taught in Balmin does not read on this limitation in claim 5.

Rewriting of queries to enhance their performance is well-known in the art. Balmin is an example of the prior art. Balmin "detects all structures applicable to the query and rewrites the query to use such structures, speeding up the performance of the queries." Balmin Abstract. In claim 5, the query optimizer rewrites the query using statistical information regarding the additional key. Balmin does not teach rewriting a query using statistical information regarding an additional key. In addition, claim 5 recites "the query optimizer rewriting the query using the statistical information in a manner that allows probing the sub-optimal index according to the rewritten query." The query rewriting in Balmin is done to improve execution time for the query. The query rewriting in claim 5 is done in a manner that allows probing the sub-optimal index according to the rewritten query. The queries in Balmin are not rewritten in a manner that allows probing a sub-optimal index according to the rewritten query. For these reasons, Balmin does not teach or suggest "the query optimizer rewriting the query using the statistical information in a manner that allows probing the sub-optimal index according to the rewritten query" as expressly recited in claim 5.

In the rejection of claim 5, the examiner also admits Lee does not explicitly disclose "the query optimizer thereby determining from the sub-optimal index an estimated number of rows in the database table that satisfy the query", then cites to Jakobsson as allegedly teaching these limitations at para. 10 lines 10-16 et seq. The cited portion of Jakobsson teaches table statistics that are persistently stored and used to estimate costs of alternative execution plans for a query. Jakobsson states at para. 10 lines 9-16:

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Examples of table statistics include table cardinalities (the number of rows in a table), the number of distinct values for a column, the minimum and maximum value in the column, and histograms, which is data that specifies the distribution of values in the columns, i.e., the number of rows that have particular column values for a column or the number of rows that have a column value that falls within a range.

These table statistics do not include an estimated number of rows in the table that satisfy a query, as recited in claim 5. The table statistics in Jakobsson may be used to estimate costs of alternative execution plans for a query. However, the table statistics in Jakobsson are not determined by a query optimizer. They are used by the query optimizer to estimate cost of an execution plan for a query. Furthermore, the table statistics in Jakobsson are not determined by the query optimizer from a sub-optimal index, as recited in claim 5. Finally, the table statistics in Jakobsson do not read on an estimated number of rows in the database table that satisfy the query as recited in claim 5.

For the many reasons given above, claim 5 is allowable over the combination of Lee, Balmin and Jakobsson, and applicants respectfully request reconsideration of the examiner's rejection of claim 5 under 35 U.S.C. §103(a).

Claim 7

Claim 7 includes many of the limitations discussed in claim 5 above, and is therefore allowable for the same reasons. Applicants respectfully request reconsideration of the examiner's rejection of claim 7 under 35 U.S.C. §103(a).

Claim 14

Claim 14 includes many of the limitations discussed in claim 5 above, and is therefore allowable for the same reasons. Applicants respectfully request reconsideration of the examiner's rejection of claim 14 under 35 U.S.C. §103(a).

Claim 22

Claim 22 includes many of the limitations discussed in claim 5 above, and is therefore allowable for the same reasons. Applicants respectfully request reconsideration of the examiner's rejection of claim 22 under 35 U.S.C. §103(a).

Claim 26

Claim 26 includes many of the limitations discussed in claim 5 above, and is therefore allowable for the same reasons. Applicants respectfully request reconsideration of the examiner's rejection of claim 26 under 35 U.S.C. §103(a).

Rejection of claims 6, 8, 15, 25 and 29 under 35 U.S.C. §103(a)

The examiner rejected claims 6, 8, 15, 25 and 29 under 35 U.S.C. §103(a) as being unpatentable over the combination of Lee, Balmin, Jakobsson and Lohman. These claims recite statistical information that comprises a frequent values list that corresponds to an additional key. In the rejection, the examiner cites to Lohman at para. 35 lines 10-15 et seq. as teaching a frequent values list. Frequent values lists are well-known in the art, as shown by Lohman. However, claims 6, 8, 15, 25 and 29 each recite a frequent values list that corresponds to an additional key in a sub-optimal index. Nowhere does Lohman teach or suggest a frequent values list that corresponds to an additional key in a sub-optimal index, as recited in these claims. As a result, claims 6, 8, 15, 25 and 29 are allowable over the combination of Lee, Balmin, Jakobsson and Lohman. In addition, each of claims 6, 8, 15, 25 and 29 depend on an independent claim that is allowable for the reasons given above. As a result, all of claims 6, 8, 15, 25 and 29 are also allowable as depending on an allowable independent claim. Applicants respectfully request reconsideration of the examiner's rejection of claims 6, 8, 15, 25 and 29 under 35 U.S.C. §103(a).

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Conclusion

In summary, none of the cited prior art, either alone or in combination, teach, support, or suggest the unique combination of features in applicants' claims presently on file. Therefore, applicants respectfully assert that all of applicants' claims are allowable. Such allowance at an early date is respectfully requested. The Examiner is invited to telephone the undersigned if this would in any way advance the prosecution of this case.

Respectfully submitted,

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